

Serial No. 09/901,746  
January 13, 2005  
Reply to the Office Action dated September 17, 2004  
Page 2 of 7

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF CLAIMS:**

Claim 1 (previously presented): A resonator comprising:

a multi-layer substrate having an upper and lower surface and including at least two grounding conductor layers and a plurality of dielectric layers, one of the at least two grounding conductor layers being disposed on the lower surface of the multi-layer substrate;

a strip line disposed between the at least two grounding conductor layers;

a microstrip line disposed on the upper surface of said multi-layer substrate; and

a through hole formed in said dielectric layers to connect said strip line to said microstrip line; wherein

portions of the one of the at least two grounding conductor layers that is closest to said microstrip line are omitted to define an omitted portion and a through hole in the one of the at least two grounding conductor layers that is closest to said microstrip line;

the through hole in the one of the at least two grounding conductor layers is aligned with the through hole in said dielectric layers and the omitted portion is aligned with the microstrip line; and

the through hole in the one of the at least two grounding conductor layers is spaced from the omitted portion such that the through hole in the one of the at least two grounding conductor layers is disposed outside of a periphery of the omitted portion.

Claim 2 (canceled).

Serial No. 09/901,746

January 13, 2005

Reply to the Office Action dated September 17, 2004

Page 3 of 7

Claim 3 (previously presented): A resonator according to Claim 1, wherein said omitted portion and said through hole in the one of the at least two grounding conductor layers define openings in said one of the at least two grounding conductor layers.

Claim 4 (previously presented): A resonator according to Claim 3, wherein at least one of the openings has one of a substantially rectangular shape and a substantially square shape.

Claim 5 (original): A resonator according to Claim 1, wherein said strip line has a substantially U-shaped configuration.

Claim 6 (original): A resonator according to Claim 1, wherein the resonator comprises only one said strip line.

Claim 7 (original): A resonator according to Claim 1, wherein the resonator comprises only one said microstrip line.

Claims 8-13 (canceled).

Claim 14 (currently amended): A voltage controlled oscillator comprising:  
a resonator including:

- a multi-layer substrate having an upper and lower surface and including at least two grounding conductor layers and a plurality of dielectric layers, one of the at least two grounding conductor layers being disposed on the lower surface of the multi-layer substrate;

- a strip line disposed between the at least two grounding conductor layers;

- a microstrip line disposed on the upper surface of said multi-layer substrate; and

Serial No. 09/901,746

January 13, 2005

Reply to the Office Action dated September 17, 2004

Page 4 of 7

a microstrip line disposed on the upper surface of said multi-layer substrate; and

a through hole formed in at least one of said dielectric layers to connect said strip line to said microstrip line; wherein

portions of the one of the at least two grounding conductor layers that is closest to said microstrip line are omitted to define an omitted portion and a through hole in the one of the at least two grounding conductor layers that is closest to said microstrip line;

the through hole in the one of the at least two grounding conductor layers is aligned with the through hole in said at least one of said dielectric layers and the omitted portion is aligned with the microstrip line; and

the through hole in the one of the at least two grounding conductor layers is spaced from the omitted portion such that the through hole in the one of the at least two grounding conductor layers is disposed outside of a periphery of the omitted portion; and

a plurality of electronic component elements disposed on the upper surface of the multi-layer substrate and arranged to define a circuit.

Claim 15 (original): The voltage controlled oscillator according to claim 14, wherein the plurality of the electronic component elements and the resonator are electrically connected to each other.

Claim 16 (canceled).

Claim 17 (previously presented): The voltage controlled oscillator according to claim 14, wherein said omitted portion and said through hole in the one of the at least two grounding conductor layers define openings in said one of the at least two conductor layers.

Serial No. 09/901,746

January 13, 2005

Reply to the Office Action dated September 17, 2004

Page 5 of 7

Claim 18 (previously presented): The voltage controlled oscillator according to claim 17, wherein at least one of the openings has one of a substantially rectangular shape and a substantially square shape.

Claim 19 (original): The voltage controlled oscillator according to claim 14, wherein said strip line has a substantially U-shaped configuration.

Claim 20 (original): The voltage controlled oscillator according to claim 14, wherein the voltage controlled oscillator comprises only one said strip line.

Claim 21 (original): The voltage controlled oscillator according to claim 14, wherein the voltage controlled oscillator comprises only one said microstrip line.